Transport Canada Transports Canada

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Marine Casualty Investigations

Enquêtes sur les accidents maritimes

# Investigation Report to the Minister pursuant to sections 477 or 480 of the Canada Shipping Act (1985)

# Rapport d'investigation au Ministre conformément aux articles 477 ou 480 de la Loi sur la marine marchande du Canada (1985)

Canada

Ce rapport est aussi disponible en français.

# REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES SURROUNDING THE STRIKING OF A CLIFF ABOVE POINT-AUX-CRÊPES, SAGUENAY RIVER QUE., BY THE CANADIAN VESSEL "PETER MISENER", ON NOVEMBER 9, 1988.

## REPORT No. 537

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# REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES SURROUNDING THE STRIKING OF A CLIFF ABOVE POINT-AUX-CRÊPES, SAGUENAY RIVER QUE., BY THE CANADIAN VESSEL "PETER MISENER", ON NOVEMBER 9, 1988.

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## Particulars of the vessel

| | |
|---|---|
| Name | "PETER MISENER" (formerly the "OTTERCLIFFE HALL" and the "ROYALTON") |
| Official Number | 329351 |
| Port of Registry | St. Catharines, Ontario |
| Call sign | VCPT |
| Gross tonnage | 17,907.57 tons |
| Net tonnage | 13,506.00 tons |
| Length | 222.5 m |
| Breadth | 22.97 m |
| Moulded Depth | 11.88 m |
| Draught (at time of striking) | Fwd: 7.34 m<br>Aft: 7.54 m |
| Type | Great Lakes bulk carrier |
| Built | 1969, steel construction. Built at Lauzon, Quebec |
| Propulsion | Three 6-cylinder Mirrlees diesel engines, total 8310 BHP, driving a controllable-pitch propeller |
| Cargo | 25,017.7 tonnes of coke |
| Crew | 24 persons |
| Passengers | One |
| Classification | Lloyd's Register of Shipping |
| Owners | Misener Shipping Limited<br>St. Catharines, Ontario |

| | |
|---|---|
| Local Agent | SECAL<br>Port-Alfred, Quebec |

**Navigating equipment**

| | |
|---|---|
| Radar 1 | Decca, RM 1626 B |
| Radar 2 | Decca, T 219 |
| Radio direction-finder | Marconi, Lodestar |
| Echo sounder | Simrad |
| Loran C 1 | Epsco |
| Loran C 2 | Furuno, LC90 |
| VHF 1 | Sailor, RT 144 B |
| VHF 2 | Sailor, C 403 |
| Gyro compass | Sperry, MR XX |
| Magnetic compass | one |
| Automatic pilot | Sperry |
| Course recorder | one |

**Description of vessel**

The "PETER MISENER" is a typical Great Lakes bulk carrier, with deck crew accommodation located forward, over the forecastle, and other crew accommodation aft, over the engine room. The main engines are controlled by means of a bridge control system. The vessel has 17 hatches providing access to 6 holds. The steering gear equipment was built by Hastie, Greenock.

**Certificates**

Certificates for the vessel have been issued by the classification society, Lloyd's Register of Shipping, and by the Canadian Department of Transport.

| | | |
|---|---|---|
| 1. | Load Line | Issued at Montreal on July 31, 1985; valid until April 2, 1990. |
| 2. | Steamship Inspection Certificate - Inland | Issued at Montreal on April 2, 1987; valid until January 16, |

| | | |
|---|---|---|
| | Steamship, Class I | 1989 |
| 3. | Radio Inspection Certificates - Great Lakes and Sea Coasts of Canada | Issued at Montreal on March 28,1988; valid until March 27, 1989. |

**Note:** All times in this report are expressed in Eastern Standard Time (UTC minus five hours).

## Background

The "PETER MISENER" on her arrival from Chicago, took two pilots aboard at Quebec City and continued en route for Port-Alfred, Que.

Following a series of helm orders executed when near Point-aux-Crêpes on the Saguenay River, the vessel began a turn to port and ran at full speed into the cliff on the western side of the river in latitude 48°13.3' N and longitude 069°54.2'W.

The bulbous bow, the forepeak and the No. 1 port side tank sustained structural damage. The cost of repairs amounted to some $600,000. The casualty did not cause injury or pollution.

## Narrative

On October 26, 1988 the "PETER MISENER" departed South Chicago, Illinois for Port-Alfred, Que. with a cargo consisting of 25,017.7 tonnes of coke. On November 2, at 0320, as usual, due to the expected long duration of the pilotage, the vessel embarked two pilots in Quebec City. The voyage from Quebec City to the Saguenay River was uneventful, apart from the strong winds and heavy seas. The two pilots took turns at the conduct of the vessel, with the vessel's navigating personnel also present on the bridge.

At about 1700, the 12-4 bridge watch relieved the 4-8 bridge watch for their meal. According to the vessel's navigating personnel, the vessel was steering 339°(G) at her economical speed of 10.5 knots. The meal for the pilot on duty was brought up to the wheel-house. The master and the second pilot went to have supper in the messroom in the after part of the vessel. At about 1727, the 4-8 personnel resumed their watch.

It was dark and the sky could not be distinguished from the cliffs, nor the cliffs from the water. The winds were easterly at 10 to 15 knots. The visibility was reduced in

drizzle.

On reaching Pointe-aux-Crêpes lighthouse, the OOW took a bearing of 260° (T) x 0.23 mile, using the radar. This position was not put on the chart but scribbled on a piece of paper.

Meanwhile, the pilot, who was keeping a watch on the port radar, saw the reflection of the Pointe-aux-Crêpes lighthouse broad on the beam. He estimated that the vessel was steering 350°(G) and that she was one half a statute mile off, and slightly above, the Pointe-aux-Crêpes lighthouse. The order to put the helm to port 20° was given by the pilot, and was repeated and immediately executed by the helmsman.

The OOW observed that the Pointe-aux-Crêpes lighthouse remained 6 points to port for a few moments before moving astern. Back at the starboard radar, he noticed a rectangular echo on the screen ahead of the vessel and turned around to identify it on the chart.

The "PETER MISENER" continued to swing to port. The pilot gave the order to put the helm amidships; a few moments later this was followed by the order "steady as she goes". The helmsman repeated the heading, 288°(G), and steered that course.

The OOW noticed echoes on the line of the heading marker of the starboard radar, but did not mention the fact to the pilot. Meanwhile, the pilot went to eat a few mouthfuls of his meal and then immediately returned to the port radar on which he was monitoring the vessel's progress. To his astonishment he saw the radar echo of the cliffs looming ahead of him. He immediately ordered the helmsman to put the helm hard over to starboard. The OOW observed the Pointe-aux-Crêpes lighthouse 6 points abaft the beam; the vessel's stern was approaching the cliff on the western side of the river, indicating that the vessel had begun to turn to starboard.

At 1737, the "PETER MISENER", at full speed, ran into the cliff on the western side of the Saguenay River. The bow slid along the cliff for some fifteen metres before coming to rest, the position being latitude 48°13.3'N and longitude 069°54.2'W, on a heading of 294°(G).

The vessel's navigating personnel sounded the whistle and the general alarm, and reduced the speed of the main engine to that sufficient to hold the vessel against the cliff. At the sound of the emergency alarm, the master ran up to the wheel-house and ordered the helm put hard over to

port. At 1739 the striking was reported to VTS in Les Escoumins. In addition, the Canadian Coast Guard cutter "ISLE ROUGE" was requested to attend the "PETER MISENER".

At about 1740 the crew was mustered on No. 1 hatch and all were present and correct. All the vessel's tanks were sounded, and the air vent pipes from the ballast and side tanks were closed. At 1750 the lifeboats were lowered to the boat deck. Les Escoumins VTS was advised that the forepeak and No. 1 port ballast tank were making water.

At 1810 the "PETER MISENER" requested the assistance of two tugs from Port-Alfred. The vessel's tanks were sounded at regular intervals and at 1815 soundings around the vessel were taken. At 1905 the CCGC "ISLE ROUGE" reached the site of the casualty and at about 2015, the "PETER MISENER" asked the cutter to try to move the laker's stern away from the cliff. By 2058 she was refloated with the assistance of the CCGC "ISLE ROUGE".

At 2120 the Ship Safety Branch of the Canadian Coast Guard gave her permission to proceed. The vessel was escorted by the CCGC "ISLE ROUGE" until 2217 and subsequently she was escorted by two tugs, the "ALEXIS SIMARD" and the "GRANDE BAIE". On November 3 at 0645 the "PETER MISENER" reached No. 2 Duncan wharf in Port-Alfred. On November 5 she departed Port-Alfred in ballast for Montreal, where repairs were carried out between November 6 and December 17.

## Analysis

### 1. Weather forecast and weather conditions

The marine forecast issued by Environment Canada for the St. Lawrence river between Donnacona and Tadoussac at 1630 Eastern Standard Time on November 2, 1988 was as follows:

> Gale warning in effect. Winds northeastly 35 to 45 knots, decreasing to 20 to 30 this evening then to north-easterly 10 to 15 tonight... Light rain or drizzle this evening and tonight... Visibilities 1 to 4 miles precipitation. Low near 2.

Some observers reported drizzle while others reported intermittent rain. However, all the witnesses stated unanimously that the night was very dark and that the shore-line could not be distinguished; the river and the cliffs merged into a single dark mass.

There was disagreement as to the actual visibility

distance and this is covered in Analysis 14.

2. Tide

Tidal differences in water depth for Pointe-aux-Crêpes were calculated using Tadoussac and Port-Alfred as ports of reference. The casualty occurred midway between those two ports. On November 2, the predicted tide times were as follows:

| | |
|---|---|
| Tadoussac: | Low water at 1508, high water at 2137. Predicted rise of tide 2.0 m |
| Port-Alfred: | Low water at 1515, high water at 2135. Predicted rise of tide 2.1 m |

At the time of the striking, i.e. 1737, the tide gauges at Tadoussac and Port-Alfred already indicated 3.21 m and 3.33 m respectively above chart datum. These levels are approximately 0.9 m higher than the predicted values, a phenomenon that is to be explained by the northeast wind that was blowing at storm force on the St. Lawrence on that particular day.

The water level in the Saguenay river at the time of the striking was more than 3 metres above the chart datum and the cove known as l'anse de Saint-Étienne, downstream from Pointe-aux-Crêpes, would therefore have been covered by the tide. Consequently, the foreshore in the cove would not have appeared on the radar screen, and the image shown on the vessel's radar would have been that of the cliff behind l'anse-Saint Étienne. Therefore, Pointe-aux-Crêpes should have been readily identifiable by radar.

3. Current

In the Sailing Directions for the Gulf of St. Lawrence and St. Lawrence River, sixth edition, 1985, we find the following under the heading 'Rivière Saguenay':

> The flood stream enters the Saguenay at Tadoussac at a rate of 3 to 4 knots with spring tides. However, in general, the flood tidal stream in the river is very weak and above Baie-Saint-Marguerite... is almost imperceptible except for a weak stream close to the shores.

Baie-Sainte Marguerite is located four miles above

Pointe-aux-Crêpes. Given the prevailing tidal conditions, that part of the Saguenay River in the vicinity of Pointe-aux-Crêpes was subject to a flood stream at the time of the casualty. According to the pilot who was on duty at the time, there was a current of approximately one knot running northward off Pointe-aux-Crêpes, then veering west-northwest off l'anse-à-Pierrot.

## 4. Pilotage

The conduct of a ship is not to be confused with the command of a ship; the former expression denotes an action, the latter a power. The fact that a pilot has control of the navigation of a vessel is only a matter of fact, not a matter of law. The use of the expression "to turn over the control of the ship" with reference to the navigation of the ship by the pilot does not mean that the pilot has assumed the place of the master. The master has, and retains, command. However, he possesses the power to delegate, and he delegates part of his authority relating to the navigation of the vessel to his subordinates, namely the deck officers, and to persons who are not members of the crew, namely the pilots.

At the time of the casualty the vessel was under the conduct of the first pilot, the OOW was checking the navigation, and the helmsman of the 4-8 watch was steering. The master and the second pilot had gone to the messroom in the after part of the vessel to have their supper.

As the alter course manoeuvre was initiated the OOW took a bearing on the Pointe-aux-Crêpes lighthouse, but, because he had previously injured his hand, the location was not plotted on the chart; it should be noted that, according to the navigating personnel, the vessel was proceeding at a distance of only two cables from the western side of the river, which is approximately seven cables wide at Pointe-aux-Crêpes. Helm orders were passed to the helmsman. Shortly thereafter, the OOW, who was keeping an intermittent watch on the starboard radar, noticed echoes on the line of the heading marker on the radar screen. However, he did not mention this observation to the pilot nor did he intervene in the helm orders to the helmsman.

## 5. Communication

Helm orders and orders concerning changes of course were passed directly by the pilot to the helmsman in English;

on occasion the numbers were stated in French. It was reported by the navigating personnel that there was no difficulty in understanding what was said. There is conflicting testimony as to whether the helmsman repeated all orders given by the pilot. It should be noted that the first pilot was giving helm orders for the most part, i.e. as opposed to giving the new courses in degrees, and that he did not ask the helmsman to repeat them.

6. Injury

During the morning of November 2, the 4-8 OOW had injured his right hand as he was trying to shift the central window in the pilot house, which was jammed. Because of that injury, he was unable either to plot the location on the chart or to enter bearings in the bridge logbook. He did, however, scribble down the figures on a piece of paper.

7. Look-out

Rule 5 of the International Regulations for Preventing Collisions at Sea, 1972, provides that:

> Every vessel shall at all times maintain a proper look-out by sight and hearing...

Furthermore, the 1978 International Convention on Standards of Training, Certification and Watch-keeping for Seafarers provides that:

> Restricted visibility
>
> ... the officer of the watch ... should ...
>
> (b) post a proper look-out and helmsman ...
>
> Look-out
>
> (a) the look-out must be able to give full attention to the keeping of a proper look-out, and no other duties shall be undertaken or assigned which could interfere with that task;
>
> (b) the duties of the look-out and helmsman are separate and the helmsman shall not be considered the look-out while steering...
>
> Navigation with pilot embarked

> Despite the duties and obligations of a pilot, his presence on board does not relieve the master or officer in charge of the watch of their duties and obligations for the safety of the ship.

At the time of the casualty, no dedicated look-out was posted forward (on the bridge) of the "PETER MISENER", and visibility was restricted. There was a pilot on the bridge but he was concerned with the conduct of the vessel and the OOW was also unable to give the look-out his undivided attention as his duties included monitoring the vessel's progress; thus neither person constituted a proper look-out as defined. The OOW also had no one assisting him, who could have plotted the vessel's position on the chart.

8. **Meals**

When the watch was relieved at about 1700, the first pilot, who was on duty, was served his supper in the pilot house. Because of a knee disability, the first pilot preferred to eat his meal on the bridge rather than in the messroom, which would have entailed waiting for the second pilot to return. The second pilot went with the master to eat supper in the messroom aft.

There is conflicting evidence as to when the first pilot consumed portions of his meal and, by extension, whether this action could have interfered with his concentration on navigating the vessel. It should be noted that the meal was served at least half an hour before the casualty and, further, that the "PETER MISENER" was on the same heading for approximately fifteen minutes before beginning her turn at Pointe-aux-Crêpes.

9. **Rest**

The first pilot, who was on duty at the time of the casualty, went to bed at 1900 on November 1 and was called by the dispatcher at approximately 0200 November 2. He boarded the "PETER MISENER" at 0320 and rested during the morning. At 1330, off Cap-au-Saumon, he took over the conduct of the vessel. Because of the heavy weather, the first pilot had the master and the second pilot with him to the entrance of the Saguenay river. The first pilot remained on the bridge from 1330 until the time of the striking, a matter of some 4 hours.

The day before the casualty, the 4-8 OOW had slept from 2000 to 0400. On the day of the casualty, he rested for

an hour between watches.

## 10. Radars

The vessel is equipped with two radars located in the forward part of the wheel-house, one on each side of the steering position. The starboard radar is calibrated in nautical miles and the port radar in statute miles. There is a 13 per cent difference in length between nautical and statute miles; however, it appears that this difference was not a contributing factor in the casualty.

The first pilot, who was on duty at the time of the casualty, used primarily the port radar, which was calibrated in statute miles. Reportedly, this radar worked satisfactorily. The OOW reportedly informed the second pilot that the radar in question was calibrated in statute miles, but the first pilot could not remember if this had been passed to him. There is a notice affixed to the port radar that informs the user of the distance scale.

Both radars featured relative displays, ship's head up. Reportedly the orientation of the radar picture on the port set was correct, the heading marker being properly aligned with the vessel's head. Neither pilot noticed anything unusual when using the port radar.

The hypothesis that a radar range of less than 3 miles was in use and hence that the distance was incorrectly estimated from the distance circles is denied by the pilot on duty at the time of the casualty. He always uses the 3-mile range on the Saguenay River, and if the radar had been set to a different range, it is claimed that it would have been noticed immediately because of the unfamiliar image on the screen.

The cliffs along the Saguenay River are known to constitute an excellent reflecting surface for radar waves.

## 11. Gyro compass

The master-compass is located in a compartment on the lower deck. There are two repeaters on the bridge, one at the steering position and the other by the forward centre window in the wheel-house. An inspection made the day after the casualty revealed that both repeaters indicated a heading 7° lower than that of the master gyro compass. According to the master of the vessel,

the master gyro compass error remains constant, and the repeaters are set to true north. Despite the substantial error of the master gyro compass, it is reported to work satisfactorily, and hence has not been adjusted. During the hours preceding the incident, the pilots did not observe any appreciable error.

## 12. Steering gear

Reportedly the steering gear was working satisfactorily before the impact. Both steering gear motors were running at the time of the casualty. Immediately after the striking, the helm, which had been hard to starboard, was put hard to port, and rudder responded normally.

## 13. Accounts of witnesses

The accounts of the witnesses reveal basically two different versions of events: one reported by the pilot who was on duty at the time of the casualty, and one reported by the vessel's navigating personnel on the 12-4 and 4-8 watches. The officer and the helmsman of the 4-8 watch returned to the bridge approximately 10 minutes before the striking. Those on the 12-4 watch had replaced them for half an hour in order to enable them to have their supper.

## 14. Areas of disagreement

Contradictory evidence was given with regard to the conduct of the vessel and the alter course manoeuvre off Pointe-aux-Crêpes.

The following items are at issue:

i) the visibility was variously reported as between zero and almost 4 miles;

ii) two different courses were claimed to have been steered between l'anse à Isaac and Pointe-aux-Crêpes; 339°(G) and 350°(G);

iii) the respective distances off, when abeam of Pointe-aux-Crêpes, would have been 0.22 miles and 0.44 miles, and

iv) the order to alter course to port would have been given when Pointe-aux-Crêpes light was bearing about 10° forward of the beam or when the light was 20° abaft abeam respectively; these observations

were not made with the aid of the radar.

Also there was disagreement on the following points:

i) that an order to steer 275°(G) was given after the ship's head had been brought to 288°(G);

ii) that an order to alter course to starboard was given before the striking, and

iii) that the vessel had begun to swing to starboard before the striking.

15. Consensus

The vessel's navigating personnel and the pilot agree on the following:

(i) the first helm order passed off Pointe-aux-Crêpes was to put the helm to port 20°; that order was repeated and executed by the helmsman;

(ii) orders to put the helm amidships and to steer on the new heading followed; these orders were reportedly repeated and the course of 288°(G) was steered, and

(iii) the site of impact and the heading of 294°(G) that were observed after the vessel had come to a stop.

In addition, the ship's head at the moment of impact is not known exactly. The master estimated the heading to be 279°(G) and the pilot appeared to share that view. This is plausible if the vessel was steering 275°(G) before she began her turn to starboard in the moments before the striking.

16. Simulation

In order to attempt to resolve those differing versions, recourse was made to a ship's manoeuvring simulator.

In order that the dynamic behaviour of the simulator's mathematical model should resemble that of the "PETER MISENER" as closely as possible, the most similar of the simulator's standard model vessels was used, but some parameters varied:

| | Simulator Model | "PETER MISENER" |
|---|---|---|
| Length of vessel | 216 m | 222.5 m |
| Deadweight | 33,000 tonnes | 28,246 tonnes |
| Turning speed | 46°/min | 34.3°/min (mean) |
| Maximum turning circle | 404 m | 402 m |
| Percentage speed loss | 35% | N/A |
| Coefficient of fineness | 0.80 | 0.88 |
| Draught | Fwd: 7.9 m<br>Aft: 8.0 m | Fwd: 7.34 m<br>Aft: 7.54 m |
| Number of propellers | one (right-handed) | one RH |
| Rudder area | 40 $m^2$ | 22.2 $m^2$ |
| Speed | 10.5 knots | 10.5 knots |
| Drift angle | 35.3° | N/A |
| Time: helm amidships to 35° | 13 s | hard over to hard over 15s |

**Note:** The drift angle is the angle between a vessel's heading and a tangent to the path of the vessel during a turn.

The simulator provided the facility of continuously plotting the position of the vessel, as determined from her speed and heading and the effects of the environmental factors.

The environmental factors programmed into the simulation were an easterly wind at 12 knots and a northward-setting current of 0.75 knot at the beginning of the turn. Two minutes after the ship had begun to turn, i.e. approximately two cable's lengths above Pointe-aux-Crêpes, the direction of the current was changed to 300°(T).

From the witnesses' accounts, four alternate scenarios were formulated covering the sequence of events leading to the casualty. The situation was re-examined on the basis of these scenarios with a view to determining the solution that fitted the circumstances as closely as possible. The simulation run included the approach

course to pass Pointe-aux-Crêpes, the manoeuvre to alter course to port and up to the moment of the striking. These four scenarios were chosen:

| Scenario | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Data on Setting-up | | | | | |
| Initial position lighthouse bg | | 240° x 0.44 | 240° x 0.44 | 260° x 0.22 | 260° x 0.22 |
| Initial heading | | 350° | 350° | 339° | 339° |
| Current | | 000° | 000° | 000° | 000° |
| Action | | Running time m s | Running time m s | Running time m s | Running time m s |
| Helm 20° to port | (A) | 00:00 | 00:00 | 00:00 | 00:00 |
| Helm amidships | (B) | 01:15 | 01:15 | 01:00 | 01:00 |
| Steady on 288°(G) | (C) | 01:30 | 01:30 | 01:15 | 01:15 |
| Change current to 300°(T) | | 02:00 | 02:00 | 02:00 | 02:00 |
| Heading 275°(G) | (D) | | 02:15 | | 02:15 |

In scenarios 3 and 4, the changes of helm were made to occur 15 seconds earlier than in scenarios 1 and 2 in order to allow for the different initial bearing of the vessel; according to testimony, the "PETER MISENER" would have begun the turn either above, or off, Pointe-aux-Crêpes. In order to consider all possible manoeuvres, an alteration of course to 275°(G) was included in scenarios 2 and 4.

The Pointe-aux-Crêpes lighthouse was used as the reference point. The co-ordinates of the vessel's position as recorded every 15 seconds enabled her simulated track to be plotted.

The points marked A, B, C and D on the output tracks indicate the vessel's position as generated by the simulator's mathematical model at the times when the changes of helm and changes of heading were programmed.

## 17. Results from the simulation

The tracks plotted from the output of the simulator for scenarios 1 to 4 are shown on the chartlets attached as Annexes 1 to 4 respectively.

1) Vessel heading 350°(G) before altering with lighthouse bearing 240° x 0.44'

As can be seen from the chartlet in Annex 1, in this scenario the vessel does not pass close to the striking position (indicated by X) and in fact would have grounded/struck the cliff on the opposite side of the river. The track requires to be offset to the south about 4.8 cables to cross the striking position.

2) As 1) but with vessel finally steering 275°(G)

In Annex 2 the situation is basically similar to 1) except that in this instance the vessel would not ground/strike the cliff until reaching the headland about 2.5 miles up river.

3) Vessel heading 339°(G) before altering with lighthouse bearing 260° x 0.22'

The Annex 3 chartlet shows that in this alternative the vessel passes close to the striking position and that if the track is offset to the south about 1.8 cables it coincides with the striking position.

4) As 3) but with vessel finally steering 275°(G)

This scenario shown in Annex 4 brings the vessel even closer to the striking position, passing about 1.2 cables off. The more direct approach to the shoreline than in 3) means that the vessel would not have skirted the previous headland as is suggested when offsetting the vessel's track in option 3).

The initial heading of 339° in scenarios 3) and 4) is closer to a course which would have been suitable for the previous leg of the river than is the 350° heading used in scenarios 1) and 2). The vessel could only have held the 350°(G) heading for a relatively shorter period of time before, and only if passing 0.44 miles off, Pointe-aux-Crêpes.

Taking the offset as a criterion, the results of the simulation tend to indicate that the most likely and realistic alternative is that set out in scenario 4.

Whilst there are differences between the simulator's mathematical model and the vessel, "PETER MISENER", the fact remains that scenario 4 is very similar to the events as given by the ship's navigating personnel, suggesting that the "PETER MISENER" was most probably on the heading of approximately 339°(G) before altering course, that she altered from the position with Point-aux-Crêpes lighthouse bearing 260°(G) at a distance of 0.22 miles and that she had altered on to a heading of 275°(T) before striking the cliff. This latter heading also being in agreement with the suggested ship's head on striking of 279°(G).

## 18. Conning position

In most vessels of modern construction, the bridge is located over the accommodation towards the stern. Like many Great Lakes bulk carriers, however, the "PETER MISENER" is a vessel of older design, and the bridge is located over the accommodation forward.

The master, OOW and/or pilot who are supervising the navigation of, and/or the conduct of, a vessel must allow some time lag or anticipate steering manoeuvres in order to offset the effect of the vessel's length, which may be considerable in some instances. When beam bearings off landmarks are used as steering references, the wheel-over manoeuvre must be, in a relative sense, anticipated in the case of a vessel whose bridge is located aft, and delayed in the case of a vessel in which the bridge is located forward.

There is conflicting testimony as to when the 'port 20°' helm order was given; whether it was given when Pointe-aux-Crêpes lighthouse was one point forward of the beam or when the lighthouse was about 20° abaft abeam. Regardless of the initial course, an alteration of course initiated too soon could have been but one of a number of reasons for the striking.

## 19. Damage

An underwater inspection was carried out in Port-Alfred, and the vessel was found to be seaworthy. After the cargo had been unloaded, the Ship Safety Branch cleared the vessel, and on November 5 the "PETER MISENER" left Port-Alfred for Montreal. Examination of the hull revealed the following damage:

(a) bulbous bow

(i) the bow plating was set back a distance of approximately 1.5 m toward the stern;

(ii) the lower section of the shell plating was buckled and/or holed over a horizontal distance of 5.8 m, from the bow, and over vertical distances of 4.5 m on the port side and 2.0 m on the starboard side, up from the keel;

(iii) the round bar, 200 mm in diameter, which secures the shell plating at the stem was distorted and fractured 6 m from the keel and set in;

(iv) the structure adjacent to the damaged plates was also buckled from the stem to frame No. 8.

(b) shell plating

(i) an indentation, 7.3 m long and 2.5 m high, at approximately 5 m from the keel between frames 10 and 25;

(ii) main frames and intermediate frames, a stringer and the collision bulkhead in way of this indentation were buckled;

(iii) plating in the indented area was holed over a length of 2.5 m and a breadth of 6 cm;

(iv) the forward air vent pipe from No. 1 port ballast tank was distorted and fractured in way of the collision bulkhead.

The holing of the bow plating, the shell plating and the air vent pipe resulted in flooding of the forepeak, No. 1 port ballast tank and No. 1 port wing tank respectively.

## 20. Incidence of casualties in the Saguenay river

Between 1980 and 1986, the Regional Information Centre (RIC) recorded 5,789 ship movements on the Saguenay River, making an average of 827 movements per year.

During the same period, Transport Canada Marine Casualty Investigations records show four casualties: two strikings involving vessels moored at wharves, one striking of a wharf, and one striking of a cliff. This latter involved a downbound vessel striking the eastern cliff in conditions of good visibility, about 2 miles above Point-aux-Crêpes and was due to an error in steering the vessel; there is no parallel with the casualty involving the "PETER MISENER".

21. Qualifications and experience of personnel

The master holds an ON 1 Certificate of Competency, issued in May 1986. He has had 17 years of seafaring experience, including ten years as an officer. He had commanded the "PETER MISENER" for approximately one month.

The chief officer holds an ON 11 Certificate of Competency issued in June 1981. He has had 10 years of seafaring experience, including eight years as an officer. He had held a position as chief officer for one year.

The helmsman on the 4-8 watch holds a quartermaster's certificate issued in 1984. He has had 30 years of seafaring experience, including 24 years as a helmsman. He had been employed aboard the "PETER MISENER" for 17 years.

The pilot on duty at the time of the casualty holds a Certificate of Competency as a First Mate of a home-trade steamship, issued in February 1951, and also a Class A pilot's licence, issued in April 1973. He had had 42 years of seafaring experience including 29 years as a working pilot.

Findings

On November 2, 1988, the Great Lakes vessel "PETER MISENER" struck the cliff on the western side of the Saguenay River half a nautical mile above Pointe-aux-Crêpes, in darkness, as a result of a navigational error. It appears that the following factors contributed to the casualty:

- visibility was restricted because of fog and rain, and as night had fallen, the river and the cliffs had become an indistinguishable dark mass;

- the turning manoeuvre was initiated too soon and too close to the cliff on the western side of the river;

- whilst eating his meal, the pilot did not devote his full concentration to the turning manoeuvre;

- because of an injured hand, the OOW did not plot the vessel's position on the chart and did not effectively monitor the vessel's movement;

- the OOW did not mention his observation of radar echoes to the pilot nor did he countermand/question the helm orders.

Other findings

The vessel's heading was not checked after every new helm and course order.

No look-out was posted on the bridge (forward).

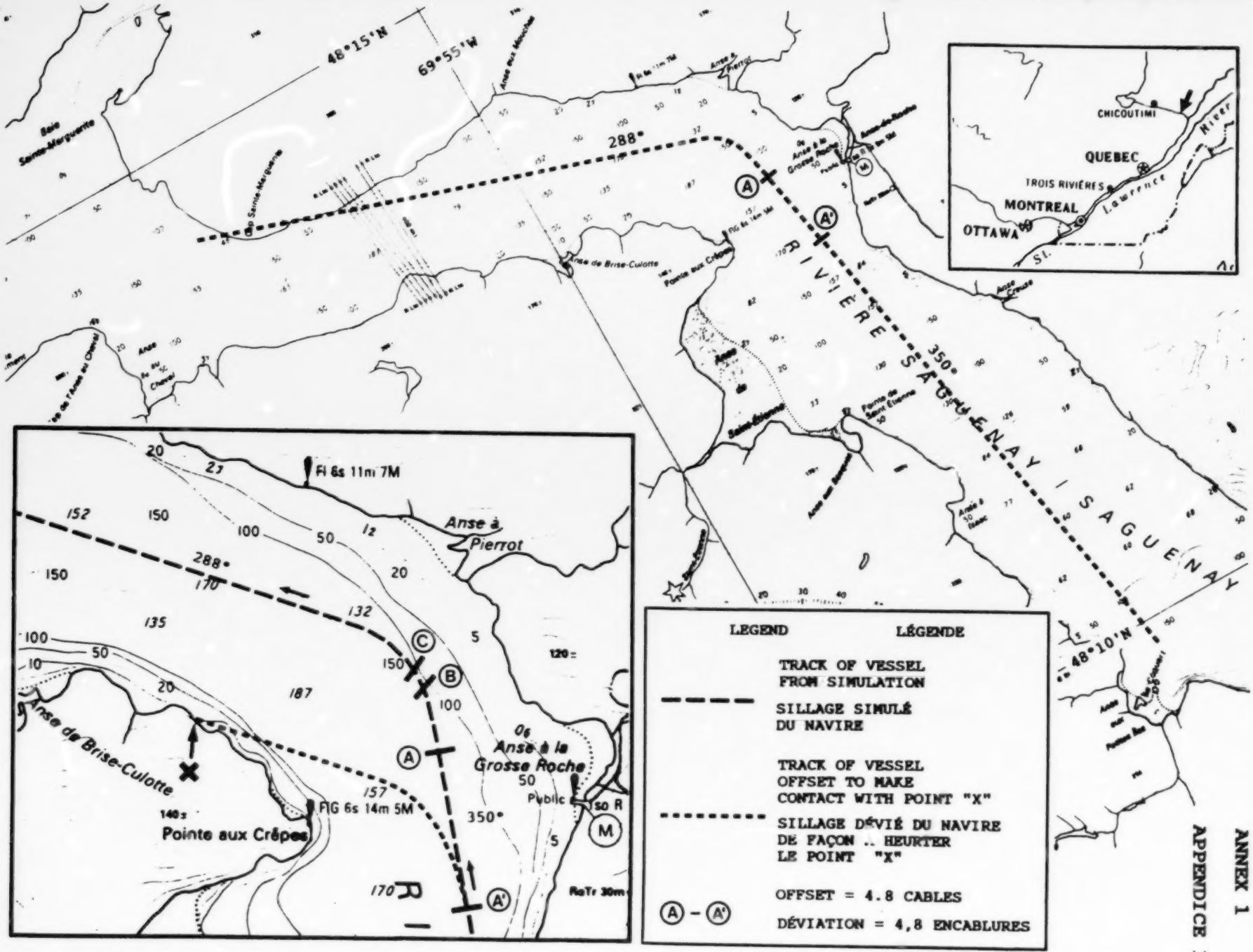
The radar navigating methods used were such that the vessel's position was not continually monitored.

The first pilot, who was on duty, ate his supper on the bridge instead of waiting to be relieved by the second pilot.

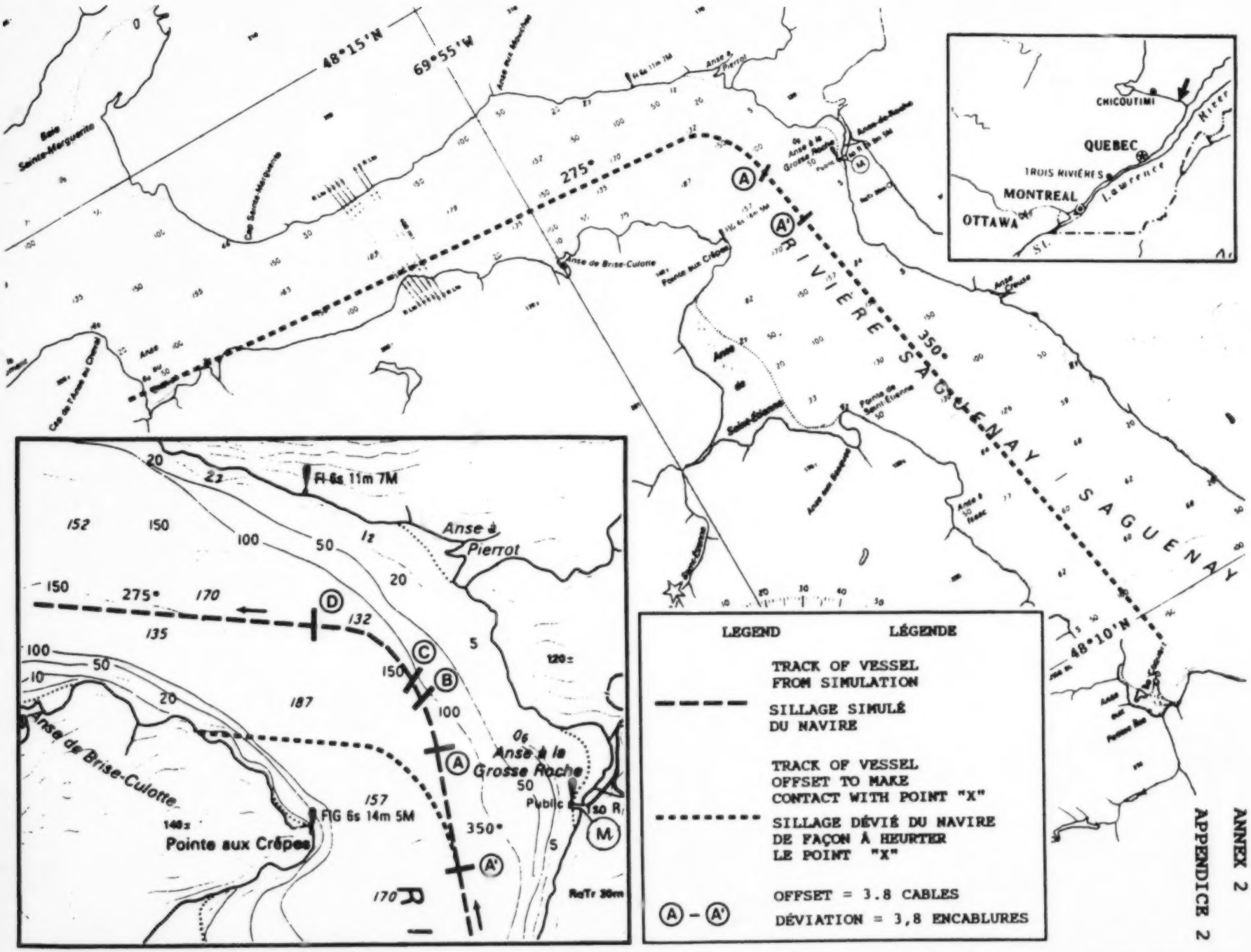
The actions taken by the master after the striking were consistent with good seafaring practice.

The master gyro compass had an error of 7° low. However, the repeaters were set to true north.

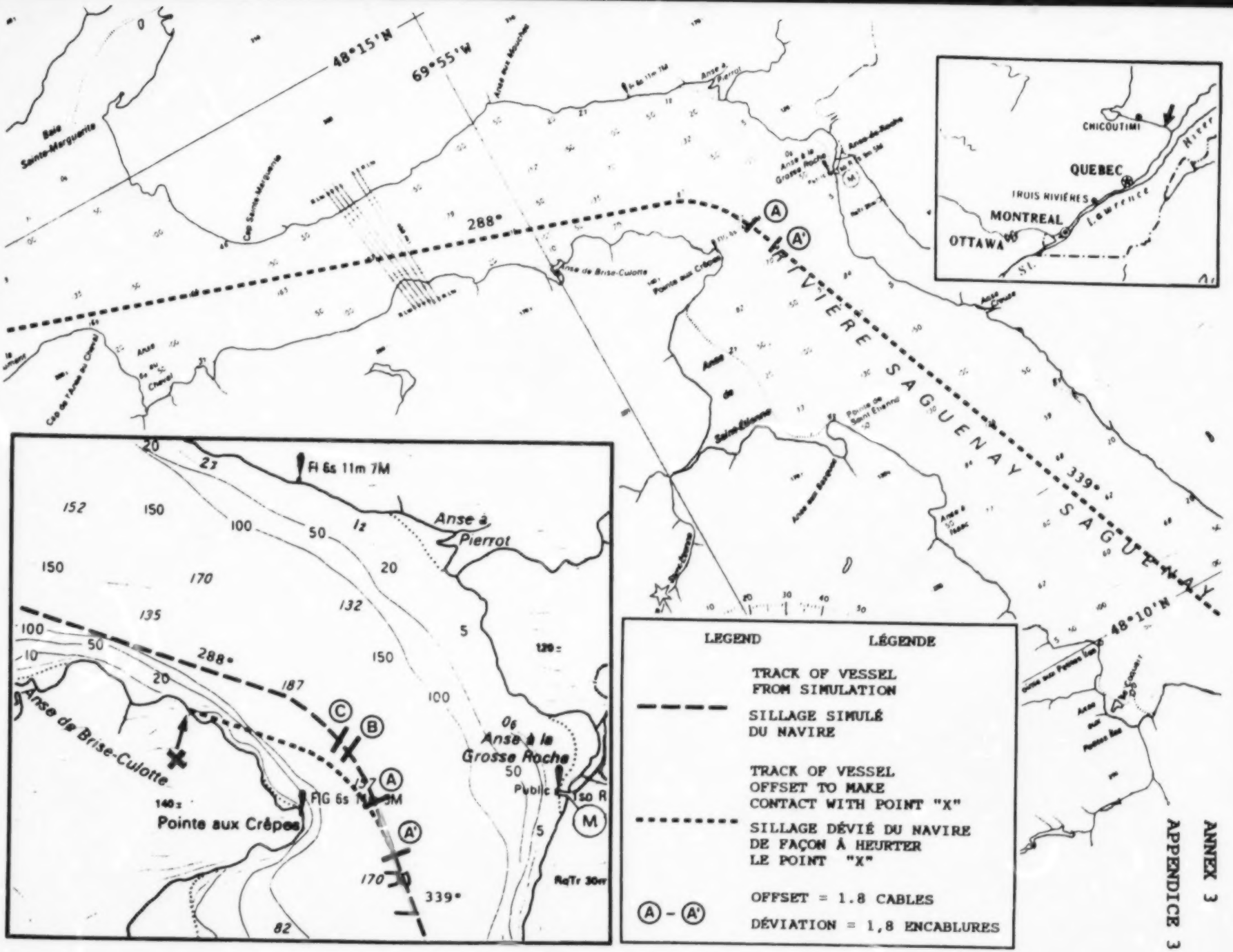
**OTTAWA, ONTARIO**
**JANUARY, 1990.**



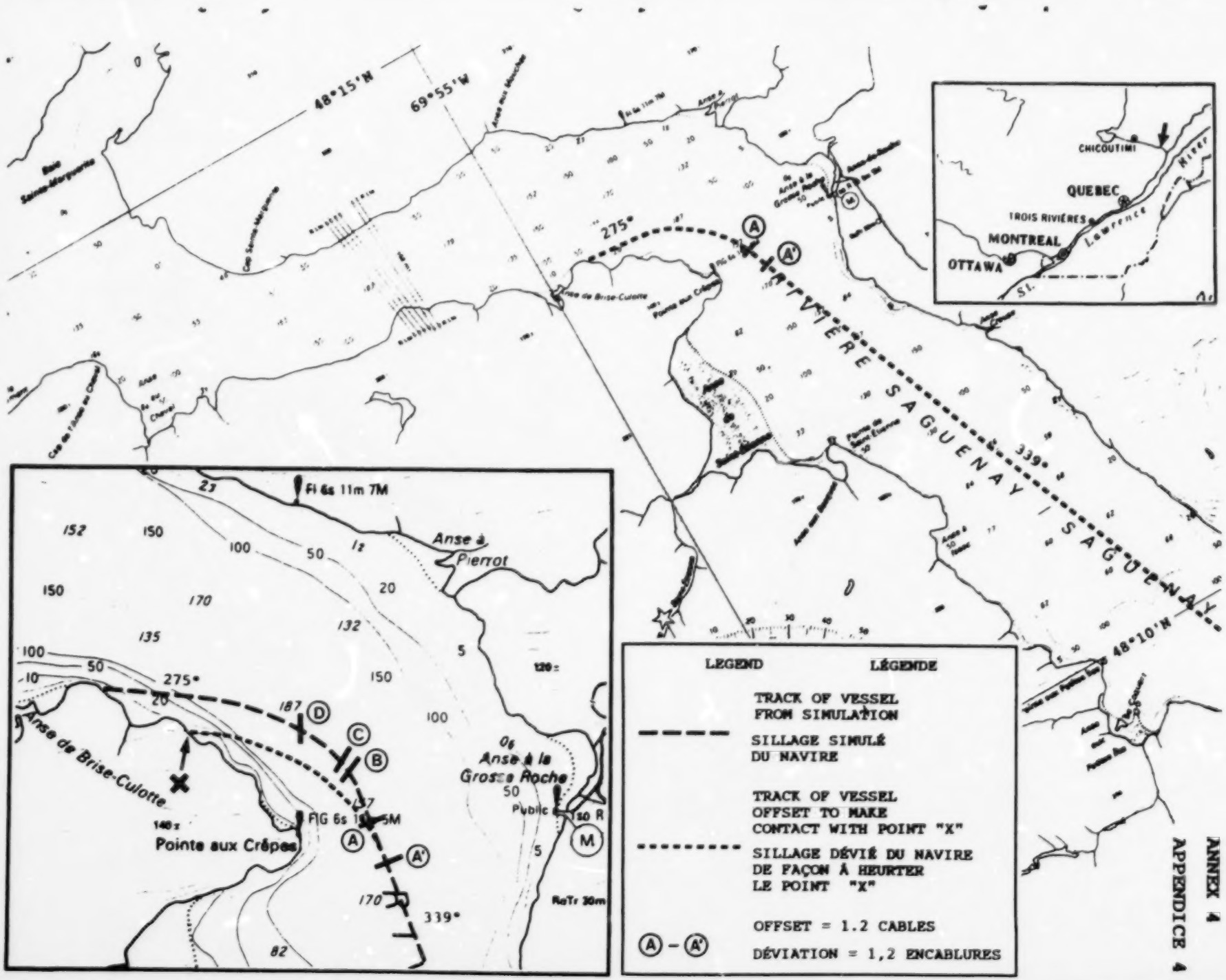

ANNEX 1
APPENDICE 1




ANNEX 2
APPENDICE 2

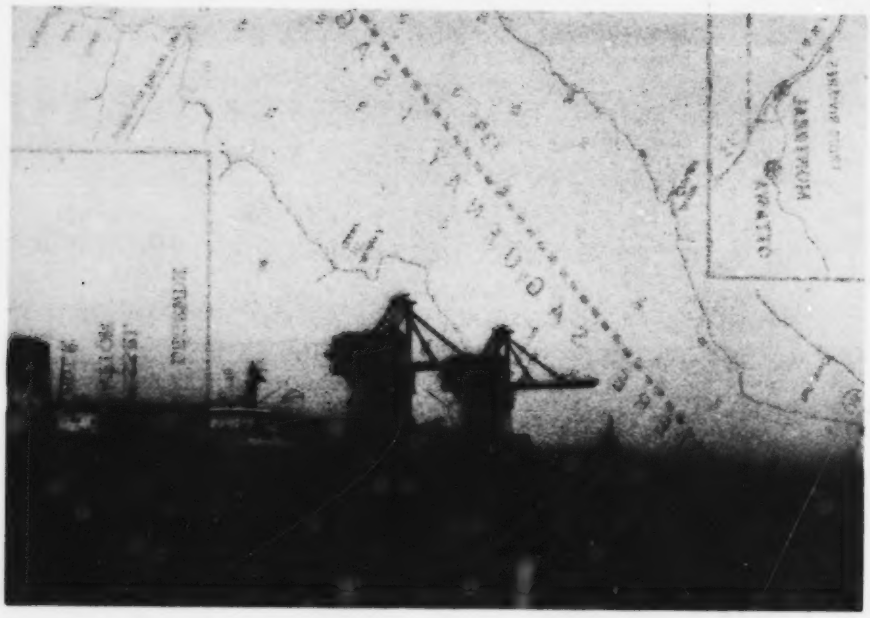



ANNEX 3
APPENDICE 3

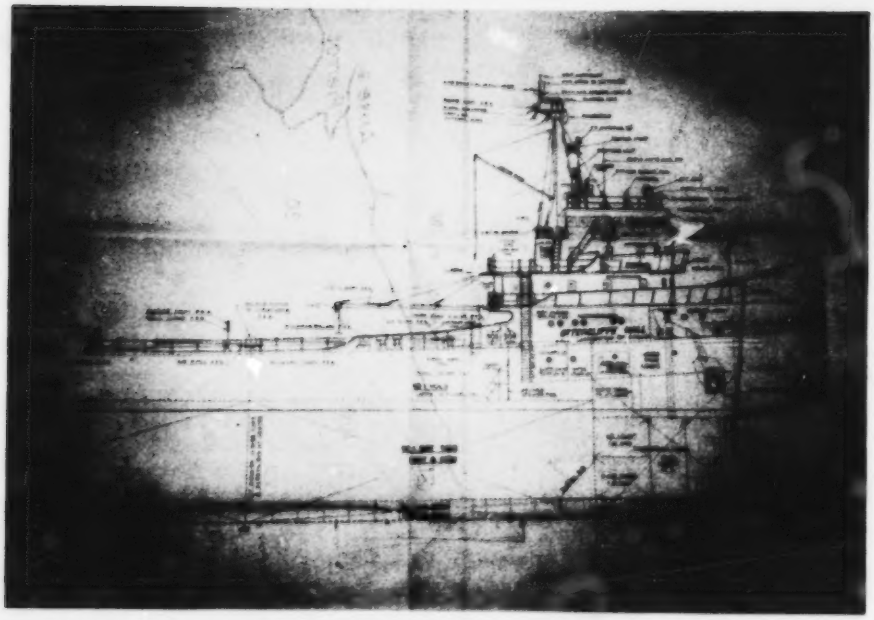



ANNEX 4
APPENDICE 4

"PETER MISENER"

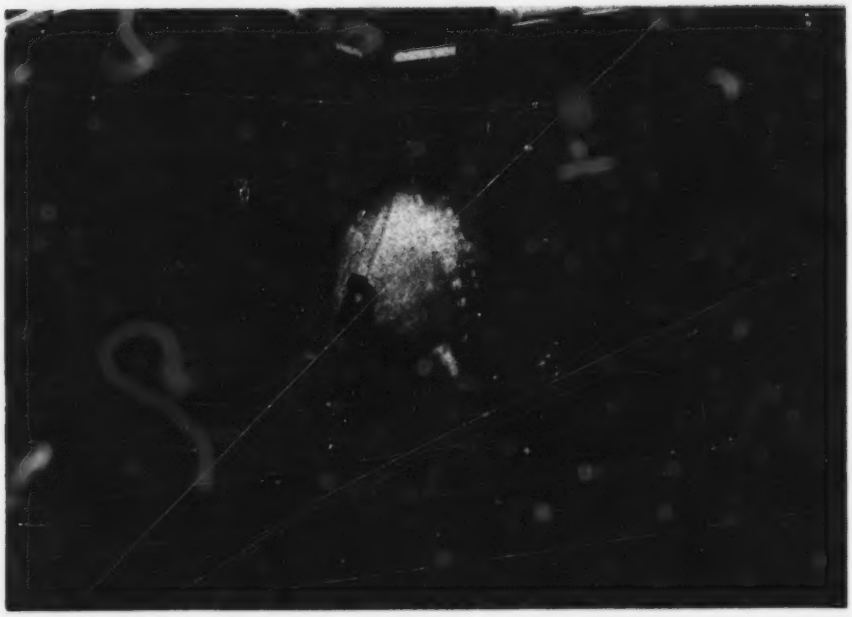


At Duncan wharf No.2 at la Baie.
Au quai Duncan n°2 à la Ville de la Baie.



Profile (forward). Coupe longitudinale (avant).

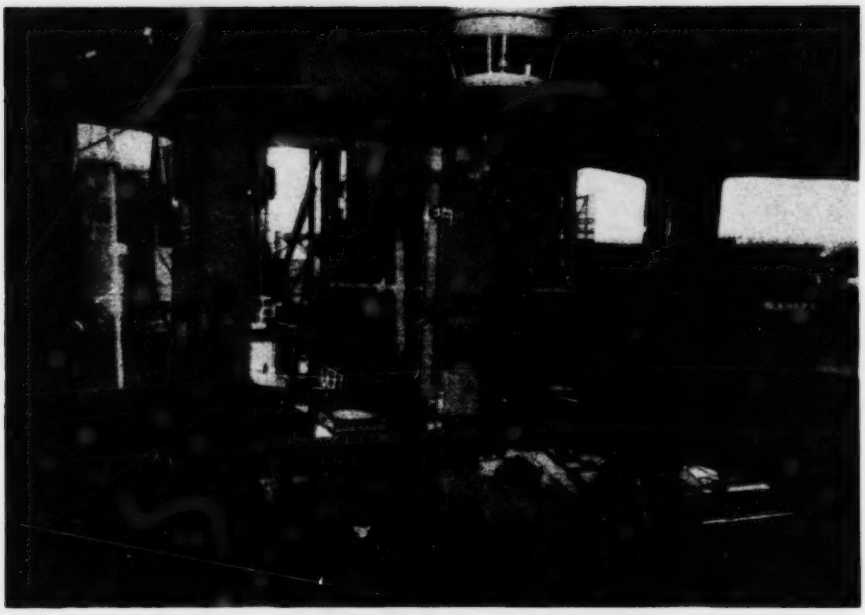
Fractured plating at bulbous bow.
Rupture des tôles du bulbe d'étrave.



Note indented shell plating on port side at waterline.
À remarquer, enfoncement de la muraille sur bâbord à la flottaison.

Bulbous bow before repairs at Montreal.
Bulbe d'étrave avant d'être réparé à Montréal.

Navigation bridge. Passerelle.



Conning position. Poste de commandement.

Steering position.
Poste de barre.

"GRANDE BAIE"

"ALEXIS-SIMARD"